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Environmental Satellite Processing and Distribution System (ESPDS) Development

Statement of Work

Version 2.0

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U.S. Department of Commerce (DOC)
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CHANGE RECORD

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The document version number identifies whether the document is a working copy, final, revision, or update, defined as follows:

- **Working copy or Draft:** a document not yet finalized or ready for distribution; sometimes called a draft. Use 0.1A, 0.1B, etc. for unpublished documents.

- **Final:** the first definitive edition of the document. The final is always identified as Version 1.0.

- **Revision:** an edition with minor changes from the previous edition, defined as changes affecting less than one-third of the pages in the document. The version numbers for revisions 1.1 through 1.9, 2.1 through 2.9, and so forth. After nine revisions, any other changes to the document are considered an update. A revision in draft, i.e. before being re-baselined, should be numbered as 1.1A, 1.1B, etc.

- **Update:** an edition with major changes from the previous edition, defined as changes affecting more than one-third of the pages in the document. The version number for an update is always a whole number (Version 2.0, 3.0, 4.0, and so forth).

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1. INTRODUCTION

1.1 Overview

The National Environment Satellite, Data, and Information Service (NESDIS) develops, operates, and maintains NOAA's operational environmental satellite programs – the Polar-orbiting Operational Environmental Satellites (POES), Joint Polar Satellite System (JPSS) and Geostationary Operational Environmental Satellites (GOES) satellite programs. These satellite programs are managed and operated by NESDIS from the new NOAA Satellite Operations Facility (NSOF) in Suitland, Maryland. In addition, NESDIS acquires numerous non-NOAA and international satellite data required for operational mission support.

JPSS, POES and GOES are in their fourth decade of continuous operational weather and climate monitoring, and are mission critical programs for NOAA's strategic goals of weather warning and forecasting, climate monitoring and forecasting, coastal and ocean environmental stewardship, and monitoring the space environment and environmental hazards such as volcanic ash, drought and wildfires. The JPSS, POES and GOES satellites provide operational global coverage on a 24x7 real-time and near-real time basis. JPSS, POES and GOES data and products are used by all NOAA line agencies, National Aeronautics and Space Administration (NASA), Department of Interior (DOI)/U.S. Geological Survey (USGS), Department of Defense (DoD), Federal Aviation Administration (FAA), Department of Homeland Security, emergency first responders, universities, international partners, private industry, and many others.

Three NESDIS offices are responsible for NOAA satellite management and operations: the Office of Satellite Product Operations (OSPO), Office of Satellite Ground Services (OSGS), and Center for Satellite Applications and Research (STAR). OSPO with its two spacecraft data acquisition stations in Wallops Island, VA, and Fairbanks, AK, is responsible for GOES satellite data acquisition, command and control, and health and safety. For JPSS, OSPO uses Svalbard and McMurdo for satellite data acquisition, command and control, and health and safety as well as POES HRPT from HIPS sites worldwide (Monterey, CA, Ewa Beach, HI, Cape Ferguson, Australia). OSGS is responsible for the development of JPSS, POES and GOES spacecraft, launch services and ground systems, and development of future satellite systems. Operational ingest, product generation and product distribution of JPSS, POES, and GOES and non-NOAA satellite data and products are the responsibilities of OSGS. STAR provides the science and research for developing new and enhanced land, atmosphere, ocean and climate applications and products that will be transferred to routine operations in OSGS.

This Statement of Work (SOW) specifies the requirements to plan, acquire, develop, implement, integrate, test, and transition new or enhanced ground satellite data processing functions such as ingest, product generation, product distribution, and infrastructure within the existing NESDIS OSGS operational processing center called the Environmental Satellite Processing Center (ESPC). Today the ESPC is a combined mission operation in the NSOF and at a back-up facility of several legacy systems. The major ESPC system segments process NOAA polar and geostationary environmental satellite data and products, as well as data and products received from non-NOAA satellite assets. Because of expansive planned technology improvements to future environmental satellite platforms and the architectural constraints of the existing legacy ESPC systems, new ground processing systems are being planned, or are currently under development.

This development acquisition is labeled ESPDS for Environmental Satellite Processing and Distribution System. The purpose of this acquisition is to develop integrated IT solutions for new and enhanced ESPC functionality by acquiring the necessary systems engineering organization, project management, technical management, business management and systems engineering expertise. The drivers for developing new functionality are the Joint Polar Satelite System, which includes National Polar-orbiting Operational Environmental Satellite System (NPOES) Preparatory Project (NPP), and GOES R-Series.

1.2   Acquisition Objectives

The acquisition objective is to evolve the ESPC from its current "stove pipe" systems into an integrated enterprise system capable of meeting technical and performance requirements of future and current satellite ground processing systems. It is also the intent of this acquisition to evolve current legacy systems into an integrated enterprise system. The contractor's enterprise solutions **shall** be flexible, adaptable and expandable to meet the requirements of newly developed or enhanced ESPC functionality. NOAA expects cost-effective, agile enterprise architecture to facilitate NOAA's ability to integrate new functionality over time based on program requirements and availability of future funding.

Figure 1 highlights the major functional segments of ESPDS, including Ingest, Product Generation, Product Distribution, and Infrastructure. Infrastructure refers to the additional functions needed to support the core functionality; for example, networks, tools, and offline applications.
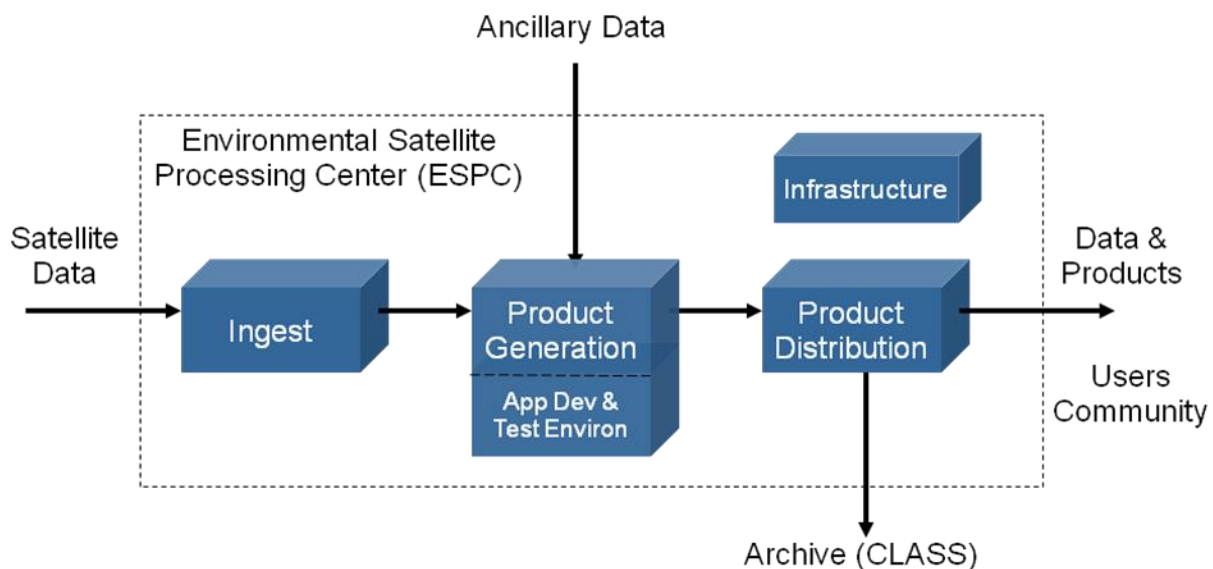

Figure 1. ESPDS Notional Architecture Segments

1.3   Acquisition Structure

The following SOW sections specify systems engineering processes, methodologies and support requirements for establishing and performing ESPDS project organization, project management, technical management, and business management tasks. The requirements define how the

contractor **shall** analyze, design, develop, fabricate, assemble, integrate, verify, validate, deliver, transition, document, and sustain new or enhanced functionality. The SOW is also referred to as an "umbrella" SOW in that it will support all new or enhanced functionality developed and implemented in the ESPC enterprise. The contract as a whole is a Task Order under the Alliant Small Business Government Wide Acquisition Contracts (GWAC). New or enhanced functionality will be incrementally awarded under this contract by the issuance of specific Work Assignments over the period of performance of the contract.

1.4 Work Assignments

Work Assignments (WA) are tasks under the Task Order contract that build upon the development and sustainment of the overall ESPDS services. They will vary from detailed requirements for new or enhanced functionality in the ESPC to requests for studies and analysis. WAs for specific system or capability deliverables will have specific, detailed requirements and specifications with firm milestone schedules.

NOAA requires that all IT-related WAs be developed and implemented as integrated IT solutions within an approved enterprise architecture baseline. To address this, the ESPC will evolve over time through issuance and execution of WAs, starting with NPOES/JPSS Data Exploitation (NDE) and GOES-R. Initial tasking will focus on two new satellite series, NPP/NPOES/JPSS and GOES-R, and Legacy satellite systems. Both of these programs require systems engineering development and sustainment to support NOAA JPSS and GOES program requirements, mission continuity and strategic objectives.

The objective of the Enterprise Satellite Processing and Distribution System is to develop an integrated solution for Legacy, JPSS, and GOES-R satellite systems with the ability to scale and expand the system to integrate future satellite missions.. Legacy systems include current operational , POES, and GOES and non-NOAA satellites. The GOES-R Ground Segment (GS) and JPSS development is currently in progress under a separate acquisitions and will occur concurrently with the ESPDS development. JPSS and GOES-R programs and will require interaction and coordination between both system developers for interface integration and testing.

Work Assignments are provided as tasks to complete capabilities within the overall enterprise solution. The enterprise solution consists of an ingest, product generation, product distribution and supporting infrastructure segment.

1.4.1   All WAs have critical milestones and have been identified in the WA Task StatementsTransition to Operations

WAs issued under this Task Order will include study, development, implementation, integration, testing and sustainment (post-delivery and pre-acceptance support) activities where appropriate. Once accepted by the Government, either through new builds, releases, versions or some other form of OSGS acceptance criteria, the new or enhanced functionality will be transitioned to OSGS for operations and maintenance. This transition will follow requirements specified in the SOW, Section 6, Transition to Operations.

1.4.2 Current Work Assignments

Listed below are the current ESPDS WAs that have been issued. Additional work assignments may be added in support of JPSS, POES and GOES-R. All activities outlined within the Task Statements for these WAs will need to be completed prior to the closure of these WAs.

- WA 0 Enterprise
- WA 1 PDA (Product Distribution & Access)
- WA 2 NDE (N-POESS Data Exploitation)
- WA 3 Ingest
- WA 4 ADRS (Ancillary Data Relay System)
- WA 6 HRIT/EMWIN (High Rate Information Transmission/Emergency Managers Weather Information Network)
- WA 7 CIP (Critical Infrastructure Protection) Support WA 8 GPDS (GCOM Product Distribution System)
- WA 10 PBS (POES Backup)
- WA 11 Consolidated Backup
- WA 12 NDE 2.0 (NPOES/JPSS Data Exploitation 2.0)
- WA 13 ESPC Infrastructure

1.4.3 Sustainment Efforts

Listed below are efforts planned for the sustainment of ESPDS to be performed to develop, modernize or enhance the components of the system.

- Developing, integrating, testing and implementing new or improved science algorithms or application capabilities, or new sub-components of an existing system
- Modernizing (or refreshing) existing hardware or software
- Enhancing operations by improving existing system components or capabilities
- Post Launch Test Support for JPSS and GOES-R Programs
- Identification of, coordination with, and integration of new data providers and consumers
- Continuous resolution of Security CIS Compliance Check NESSUS and SCA findings including security patching and adhering to NOAA Security policy directives
- Retrace requirements to new government enterprise requirements documents
- Troubleshoot and resolve any issues found during operations

1.4.4 Future Work Efforts

Listed below are future ESPDS work efforts that may or may not be issued pending requirements development and funding. It is provided only to show the scope of potential future tasks.

- GOES-R Unique Payload Services upgrades
- GOES-R Data Exploitation – similar to NDE
- JPSS Unique Payload Services upgrades (including Block 3.0 support services)
- Designated Backup Support Services (including GOES-R)
- Configuration and support of new data sources (i.e. Himawari 8, Sentinel)

1.4.5 Future Evolutions and Trades

Listed below are future evolutions of the enterprise system which may be required after the initial work efforts are completed. These evolutions may require trade studies to be done for determining best approach forward for implementation, leveraging resources such as the the NESDIS Virtual Test Lab (VTL) when feasible. These include but are not limited to:
- Utilizing a common Ingest Service
- Extending capabilities to include CLASS in the enterprise infrastructure
- Evolutions to common enterpirse services and infrastructure to reduce long term sustainment costs (i.e. Service Bus, Database, Logging and Reporting, Monitoring, Configuration and Patch Management, etc.)
- New Help Desk Support System to consolidate monitoring systems
- Virtualization of enterprise components (i.e. NDE)
- Enhanced/Enterprise PG Compute Framework

1.5 Terminology

The terms "Government" and "Government personnel" refer to Federal Government employees.

The term "Government representatives" means Federal Government employees and Government support contractors.

The term "**shall**" designates a requirement. The terms "will" and "is" designate statements of fact.

The term "Delivery" means release of studies, capabilities, or systems (hardware, software) to the Government for acceptance.

The term "Operational Acceptance" refers to mutual acceptance between the Government's Operations and Maintenance organization and the Government's project office to operate and maintain the delivered systems or capabilities.

The terms "provide" or "submit" means provided or submitted to the Government.

The terms "site" and "on-site" refer to the NOAA Satellite Operations Facility (NSOF) unless otherwise stated.

The term "off-site" refers to a non-Government site.

The term "factory" refers to the location of the contractor's development and sustainment effort.

The term "pre-shipment" refers to the project status prior to the on-site integration testing for the production environment.

The term "COTS" refers to Commercial-off-the-shelf software and hardware, which includes both proprietary and open-source software.

The term "segment" defines one of the four ESPDS architecture segments; ingest, product processing, product distribution, and infrastructure.

The term "CICB" refers to the contractor's program-level Configuration Item Control Board (CICB) and any sub-board which is empowered to authorize the final disposition of an engineering change.

The term "milestones" refer to key programmatic events, which define progress and completion for each WBS element, along with the definition for its successful completion.

The term "deviation" refers to the documentation of a planned variance from the requirements.

The term "waiver" refers to the documentation of an unplanned variance from the requirements.

The term "external" refers to any system outside of ESPDS that receives or provides ESPDS data.

1.6   Order of Precedence

Any inconsistency in documents, exhibits, and attachments **shall** be resolved by giving precedence in the following order:

- Statement of Work
- Work Assignment
- System Requirements Documents
- Interface Requirements Documents / Interface Control Documents [CDRL SE 7]
- Applicable Documents

In the event of any unresolved conflict, the contractor **shall** request conflict resolution by the Contracting Officer Representative who can forward to the Contracting Officer for resolution if needed.

1.7   Applicable and Reference Documents

The Applicable and Reference Documents List is supplied as a separate document (Section J.10), listing each of the documents and information sources that are cited within ESPDS Development requirements documents. Applicable documents typically are Government-prepared and controlled documents and industry standards documents. Reference documents are intended to amplify or clarify the information or requirements presented in a document.

The applicable documents cited within this SOW form a part of the SOW as specified. In the event of conflict between different applicable documents, the precedence **shall** be determined as follows.

The requirements of the NOAA documents **shall** take precedence over the requirements of other documents.

The requirements of Government documents **shall** take precedence over Contractor documents and industry standards.

2. PROJECT MANAGEMENT

The contractor **shall** provide all management and engineering services, personnel, materials, and equipment necessary to design, analyze, validate, develop, integrate, test, evaluate, verify, deliver, transition, document, and support new capabilities, ESPC enhancements, or ESPC interface enhancements.

The contractor **shall** put in place a project management structure to ensure that all requirements of this contract are accomplished within cost and on schedule.

The contractor **shall** conduct its work in accordance with contract delivered schedules, plans and other documentation [CDRL document].

The contractor **shall** develop and implement a Project Management Plan [CDRL PM 1] that defines the project's objectives, technical approach, cost, schedule, risks, implementation approach, and the environment within which the project operates.

The contractor **shall** document in the Integrated Master Plan (IMP) [CDRL PM 2] all Events, Significant Accomplishments, and associated Accomplishment Criteria necessary to execute the total effort required by this Task Order.

The contractor **shall** perform all project management functions necessary to execute the total effort required by this Task Order, as outlined in the IMP [CDRL PM 2].

The contractor **shall** designate an ESPDS Development Project Manager, who will be included in the Key Personnel clause of the contract, with sufficient corporate authority to ensure that the ESPDS project cost, schedule and technical requirements are fully met.

The contractor **shall** provide a Handover Approach Plan [CDRL PM 3] to support transfer of in-process development activities and duties from the legacy ESPC Operations and Maintenance (O&M) contractor.

The contractor **shall** provide a Handover Recommendation Plan [CDRL PM 4] to support transfer of in-process development activities and duties to the subsequent Development contractor.

2.1 Business Management

The contractor **shall** prepare and conduct a Post-Award Conference covering a line-by-line review of the ESPDS schedule and clauses, SOW, Requirement Specifications, Contract Deliverable Requirement List (CDRL), Work Breakdown Structure (WBS), and all current WAs within one month after logical follow-on award.

The contractor **shall** provide information technology resources to perform ESPDS work required by this contract unless otherwise identified in a specific WA. The Government will have responsibility for authorizing access to existing resources.

The contractor **shall** establish a joint contractor/Government representative working group to define acceptable requirements and methods for ESPDS acquisition support data systems. These systems include access via the Internet, provisions for protected electronic mail, a secure internet-based information exchange and document management/collaboration system or portal, transmission of all contractor, subcontractor, vendor proprietary data, ITAR/EAR Controlled

information, and Sensitive but Unclassified information between all participants under this contract.

The contractor **shall** establish and maintain a document management process that is capable of supporting all ESPDS data and documentation, including schematics, block diagrams, drawings, analyses, plans, procedures, and reports, to the Government.

The contractor **shall** ensure that Internet-based information is accessible with Government approved encryption by personnel designated by the Government.

The contractor **shall** employ encryption capabilities that are compatible with the applicable edition of NIST Federal Information Processing Standard (FIPS) 140, Security Requirements for Cryptographic Modules, and related NIST guidance.

The contractor **shall** be listed on the Capability Maturity Model Integration (CMMI) Web site of the Software Engineering Institute (SEI) Published SCAMPI Appraisal Results [http://sas.sei.cmu.edu/pars/] as having been SCAMPI A appraised at a CMMI Maturity Level 2 (Level 3 desirable).

The contractor **shall** update the Government's ESPDS Action Item Database for collecting and reporting all Action Items and Requests for Action from reviews, meetings, and teleconferences, and other interactions with Government representatives.

The contractor **shall** capture action items from all reviews and meetings (including IPTs).

The contractor **shall** make action items available in the Government's ESPDS Action Item Database within 7 days of generation.

The contractor **shall** include escalation, integration, and tracking of action items requiring management attention to the Government issues database.

The contractor **shall** document the WBS element and WA impacted for each action item.

The contractor **shall** provide administrative support for all reviews and joint meetings.

The contractor **shall** provide all ESPDS data and documentation deliverables in accordance with the ESPDS Contract Deliverable Requirements List and the Document Management Plan.

The contractor **shall** provide tailored ESPDS CDRLs in accordance with the individual WAs.

The contractor **shall** hold all ESPDS reviews and meetings at their facility unless otherwise directed by the Government.

The contractor **shall** submit Meeting Minutes [CDRL PM 5] for meetings with Government representatives unless otherwise stated by the Government.

The contractor **shall** provide a Task Order and Work Assignment Closure Plan [CDRL PM 6] to support project administration close out.

2.1.1 Schedules

The contractor **shall** ensure that the Integrated Master Schedule (IMS) [CDRL PM 7] is consistent with the Events, Significant Accomplishments, and Accomplishment Criteria described in the Integrated Master Plan [CDRL PM 2].

The contractor **shall** include the development of significant external interfaces and the receipt of critical items from suppliers, teammates, or other detailed schedules that depict significant and/or

critical elements, product handoffs; and Government furnished equipment or information dependencies for the entire contractual effort in a single integrated network in the Integrated Master Schedule [CDRL PM 7].

The contractor **shall** define and schedule the discrete ESPDS tasks/activities that will be completed over the Task Order period of performance using the IMS [CDRL PM 7].

The contractor **shall** use the IMS [CDRL PM 7] as an execution tool and to periodically assess progress towards meeting project requirements.

The contractor **shall** use the IMS [CDRL PM 7] to status, report, and document approved ESPDS project schedules and report any schedule concerns to the Government

The contractor **shall** perform appropriate analysis of the IMS and report potential or existing problem areas and recommend corrective actions to eliminate or reduce schedule impact.

The contractor **shall** originate all schedule information delivered to the Government or presented at project reviews from the IMS [CDRL PM 7].

2.1.2   Project Management Status

The contractor **shall** provide project management status reports [CDRL PM 8] to the Government.

The contractor **shall** conduct working group meetings at least every two weeks with the Government to review and discuss associated WA technical information, action items and issues.

The contractor **shall** conduct monthly ESPDS Project Management Status Reviews (PMSRs) and generate PMSR data packages [CDRL PM 9] for the purpose of reviewing the technical, risk, schedule, and cost status of the Task Order.

The first ESPDS PMSR **shall** be held fifteen (15) days after the initial Integrated Baseline Review (IBR).

2.1.3   Contract Administration

The contractor **shall** provide the contractual and cost management efforts necessary to provide proposals for, execute, and close out each WA on the ESPDS Task Order.

The contractor **shall** structure all plans, schedules, accounts, loading, and WAs in accordance with the ESPDS Work Breakdown Structure (WBS).

The Contractor **shall** maintain and update the WBS and dictionary throughout the life of the contract and use a WBS structure for all contract reporting in accordance with the ESPDS WBS and dictionary. Prior approval of the Government is required for any changes to the WBS structure at the reporting level [CDRL PM 15].

The contractor **shall** prepare and conduct an initial IBR which addresses the content of IBR Data package [CDRL PM 10] within 60 days after the Task Order Award. The initial IBR shall include data from awarded WAs.The contractor **shall** prepare and conduct delta WA IBRs within 60 days after Authorization-To-Proceed (ATP), with updates as required to define, document, and update the contract Performance Measurement Baseline (PMB).

The contractor **shall** develop an Earned Value Management System (EVMS) Plan [CDRL PM 11].

The contractor **shall** manage all ESPDS project finances and provide Contract Performance Reports [CDRL PM 12] to the Government.

The contractor **shall** report funding status and projected requirements to the Government in an Contract Funds Status Report [CDRL FM 1].

The contractor **shall** collect and deliver the Cost Analysis Data Summary Report [CDRL FM 2] and conduct estimation activities electronically in a delivery method deemed acceptable by the Government.

The Contractor **shall** provide evidence of EVM system validation, or, if not currently validated, the system status and outstanding actions for validation.

2.1.4   Property

The contractor **shall** develop and use a Personal Property Management Plan [CDRL PM 13] to identify and account for Government property in the possession of the contractor from the time the property is acquired until it is returned and accepted by the Government.

The contractor **shall** provide an Annual Personal Property Inventory [CDRL PM 14] to the Government in an electronic format that can be uploaded into the Government's Property Management System.

2.1.5   Licensing

The contractor **shall** transfer all software licenses, software support contracts, hardware warranties, and service agreements to the Government at Operational Acceptance. The Government will own all software licenses.

The contractor **shall** provide all licenses required to ensure the lifecycle operation and maintenance of the ESPDS for one year after Operational Acceptance.

The contractor **shall** describe ESPDS hardware and software license planning, support, and transition [CDRL SW 1],[CDRL HW 2].

2.2   Risk Management

The contractor **shall** document the risk management plan and process in the Project Management Plan [CDRL PM 1].

The contractor **shall** support the Government Risk Management process, including the provision of technical inputs and impacts regarding ESPDS-related risks and issues coming before the Government Risk Management Working Groups and Risk Management Board.

The contractor **shall** develop and enter risks into the ESPDS risk database throughout the contract Period of Performance (POP), listing all ESPDS risks by WBS element along with the probability, impact, handling strategy, and status for each.

For items tracked via the risk database and register, the contractor **shall** maintain due date, current status information, and justification for final closure, date closed, and provisions for Government concurrence.

The contractor **shall**, prior to accepting a high risk, request and secure Government concurrence and provide supporting rationale that all reasonable handling options (within cost, schedule, and technical constraints) have been instituted.

2.3   Integrated Change Control

The contractor **shall** implement an ESPDS integrated change control process that is consistent with the Satellite Product and Services Review Board (SPSRB) and the Government ESPDS Integrated Change Control Plans, including Document Management and Change Control.

The contractor **shall** include an Integrated Change Control plan as part of the Project Management Plan [CDRL PM 1].

The contractor **shall** develop and maintain a Document Tree [CDRL CC 1] that incorporates required SPSRB documents, and a Specification Tree [CDRL CC 3].

The contractor **shall** support the Government CCB process, including the provision of technical inputs regarding ESPDS-related actions coming before the Government Engineering Change Review Boards and CCB.

The contractor **shall** document, create, and maintain a Configuration Item Control Board (CICB) that includes Government representation for the purpose of classifying, managing, assessing, and controlling changes to configuration items.

The contractor **shall** charter and chair a CICB that will conduct meetings at least on a monthly basis.

The contractor **shall** submit CICB documentation [CDRL CC 6] one week prior to CICB discussion and action.

The contractor **shall** generate Change Requests [CDRL CC 4] for all requested modifications to ESPDS documents and drawings under baseline control.

The contractor **shall** submit Change Requests [CDRL CC 4] affecting Government scope, schedule, and budget to the Government CCB for approval and disposition.

The contractor **shall** manage changes that do not affect Government scope, schedule and budget through the CICB.

If the Government determines that a non-scope classification is incorrect, the contractor **shall** resubmit the change to the Government CCB.

The contractor **shall** document any ESPDS requirement waivers and deviation requests [CDRL CC 7] and submit them to the Government for approval.

The contractor **shall** submit a Configuration Management Plan [CDRL CC 8].

The contractor **shall** submit a Configuration Item Identification List [CDRL CC 5] and provide updates when configuration items change.

The contractor **shall** identify and track all Configuration Items (CIs) in the Configuration Item Identification List [CDRL CC 5] in a manner consistent and compatible with the Government property management system.

The contractor **shall** submit an Anomaly Tracking List [CDRL CC 9] to provide a record of errors that can assist in risk assessment, expense analysis, and resolutions for future trouble-shooting.

The contractor **shall** implement a configuration management system that is consistent with the Government processes and produces exportable files for integration with the Government Configuration Management system (TBS).

The contractor **shall** plan and implement a transition of the configuration management processes and activities from the contractor configuration management system to the Government system, prior to WA delivery.

The contractor **shall** implement a configuration management system that:

1. Tracks hardware, software, and network specifications and configurations
2. Provides baseline management and control of hardware and software requirements, architecture, design, source code, compiler, data, and documentation
3. Supports project, segment, file group, and criteria baselines
4. Supports identification and control of configuration items
5. Is accessible to all necessary government regulatory agents
6. Allows simultaneous development updates and coordination by more than one person and across multiple locations
7. Supports physical and logical data models
8. Supports role based authorization
9. Supports baseline modifications, comparisons, and merges
10. Employs source code version control tool to check in/ check out current or previous versions of a source file
11. Supports restoration of previous versions
12. Supports automatic roll-backs of incomplete check-ins
13. Supports use of development status dashboards with key indicators, trends, etc
14. Supports integration with external repositories
15. Supports integration with defect tracking and test management tools
16. Uniquely identifies the build status of both developmental and operational configuration items
17. Supports individual feature releases and patch tracking by user, time and date

2.4 Subcontract Management

The contractor **shall** be responsible for the performance, including the technical, cost, and schedule performance, of all subcontractors.

The contractor **shall** provide technical and management oversight and status reporting for all subcontract activities in accordance with the Subcontract Management section of the development contractor's Project Management Plan [CDRL PM 1].

The contractor **shall** ensure requirements from this SOW, the specific WAs, the ESPDS Contract Deliverables Requirements List (CDRL), and applicable documents flow down to the subcontractors.

The contractor **shall** integrate subcontractor schedules into the Integrated Master Schedule (IMS) [CDRL PM 7].

3. SYSTEMS ENGINEERING & INTEGRATION

3.1 Systems Engineering

The contractor **shall** develop and deliver a Systems Engineering Management Plan [CDRL SE 1].

The contractor **shall** perform all ESPDS systems engineering and integration functions that are necessary for the requirements development, definition, design, integration, testing, verification and validation (V&V) of each ESPDS Delivery or WA.

The contractor **shall** designate an ESPDS chief systems engineer, who will be included in the Key Personnel clause of the contract, to conduct and coordinate day-to-day systems engineering activities, oversee implementation of the Systems Engineering Management Plan [CDRL SE 1] and all ongoing development and sustainment activities, and act as the technical interface with the Government.

The contractor **shall** support or conduct Technical Interchange Meetings (TIMs) requested by the Government ESPDS Development Project Manager for the purpose of discussing and resolving items of interest.

The contractor **shall** provide the Government at least five (5) working days advanced notification of each TIM or meeting in which Government representatives are requested to attend in order to facilitate Government representatives' attendance.

3.1.1 Government Coordination

The contractor **shall** work with the JPSS Program, GOES-R Ground Segment Project, OSPO and OSGS Project Offices and the ESPC O&M contractor, as directed by the Government, to support delivery, pre-acceptance testing, and transition to operations. The contractor **shall** develop, document, and implement a Facilities Plan [CDRL TO 10].

The contractor **shall** work with STAR, OSPO and OSGS, through and as directed by the Government, to support product transition from research to operations.

The contractor **shall** work with STAR, OSPO and OSGS, through and as directed by the Government, to identify and propose solutions for any science impacts to operational systems due to ESPDS design, development, sustainment, and implementation.

The contractor **shall** support Government-run ground segment pre-launch evaluation and testing and post-launch test planning, preparation, execution, and analysis as directed by the Government.

The contractor **shall** provide technical support and resources, as directed by the Government, to participate in Government and Government-vendor Integrated Product Teams (IPTs), technical interchange meetings, and working groups.

The contractor **shall** provide access for Government representatives, the JPSS Program, GOES-R Ground Segment vendors,OSPO, the ESPC O&M contractor, and ESPC stakeholders, as authorized by the Government Project Management Office, to attend reviews and tests and participate in technical interchange meetings.

3.1.2   Architecture

The contractor **shall** obtain the As-Is ESPC architecture from the ESPC O&M contractor, through the government. The As-Is ESPC architecture includes ESPC hardware and software configurations and system performance.

The contractor **shall** design, develop, and deliver a series of ordered, disciplined target To-Be enterprise architecture solutions [CDRL SE 3] for ESPC operations that meet system requirements, incorporates evolution of the legacy system, meets the schedule needs of the individual WAs, and incorporates the target framework, including the NOAA-NESDIS Technical Reference Model (TRM) .

The contractor **shall** develop an Operations Concept [CDRL SE 4] for each To-Be enterprise architecture solution [CDRL SE 3], organized by the major functional segments: Ingest, Product Generation, Product Distribution, and Infrastructure.

The contractor **shall** conduct analysis of and apply reuse of ESPC system elements in the ESPDS enterprise architecture, as directed by the Government.

3.1.3   Requirements and Specifications

The contractor **shall** perform systems analyses and requirements allocation in accordance with the SEMP [CDRL SE 1] to derive lower-level ESPDS and WA requirements specifications [CDRL SE 5] and design specifications, including interface requirements [CDRL SE 6].

The contractor **shall** document and maintain the allocation and traceability of Government ESPDS requirements to contractor defined lower-level requirements, including identification of derived requirements.

The contractor **shall** deliver all contractor prepared ESPDS and WA Requirements Specifications [CDRL SE 5], [CDRL SE 6].

The contractor **shall** comply with the NDE, JPSS, GOES-R, and legacy ESPC interface requirements/control documents.

The contractor **shall** develop Interface Requirements Specifications (IRSs) [CDRL SE 6] when subsystems or capabilities cross any of the four major segments of the ESPDS framework: Ingest, Product Generation, Product Distribution, and Infrastructure.

The contractor **shall** develop ICDs when subsystems or capabilities cross any of the four major segments of the ESPDS framework: Ingest, Product Generation, Product Distribution, and Infrastructure [CDRL SE 7].

The contractor **shall** develop Interface Requirements Specifications (IRS) [CDRL SE 6] for all ESPDS external interfaces that do not have existing IRSs, or which are assigned to other vendors.

The contractor **shall** develop Interface Control Documents (ICD) [CDRL SE 7] for all ESPDS external interfaces that do not have existing ICDs or which are assigned to other vendors.

The contractor **shall** implement and maintain a Requirements Management Process per the SEMP [CDRL SE 1] that enables the identification, organization, detailing, control, export, and linking of ESPDS requirements.

The contractor **shall** use the IBM, formerly Telelogic, DOORS® requirements management tool to capture, link, trace, analyze, and manage changes to ESPDS requirements documentation.

The contractor **shall** use Government-provided archived DOORS project modules that include traceability to documents.

The contractor **shall** replace Government DOORS modules with new modules as received from the Government and update link traceability, as necessary.

The contractor **shall** incorporate DOORS modules provided by the Government into their DOORS database.

The contractor **shall** provide DOORS modules to the Government for inclusion into the Government database.

The contractor **shall** provide electronic access to the requirements management tool and requirements data for at least ten (10) Government-designated personnel.

The contractor **shall** develop and maintain quality assurance requirements.

The contractor **shall** allocate Reliability, Maintainability, and Availability (RMA) requirements to the architecture segment level as appropriate.

The contractor **shall** impose RMA requirements consistent with the allocations on any subcontractors, suppliers and commercial off-the-shelf (COTS) vendors whenever appropriate.

The contractor **shall** trace all requirements to specific verification methods, plans and procedures.

The contractor **shall** track and log all changes to the baseline requirements.

3.1.4 Analysis and Trade Studies

The contractor **shall** perform analyses and trade studies [CDRL SE 16], including associated risk assessment and life cycle cost implications, to define and develop ESPDS designs.

The contractor **shall** perform analyses and trade studies as defined in WAs.

3.2 Integration and Test

The contractor **shall** submit and implement an ESPDS Integration and Test Plan [CDRL IT 1].

The contractor **shall** develop and implement Detailed Test Plans and Procedures [CDRL IT 2] for each ESPDS Delivery to perform the activities identified in the Integration and Test Plan [CDRL IT 1].

The contractor **shall** develop a Software Test Plan [CDRL SW 6] to guide software testing, to include security testing of all software developed or purchased for ESPDS Delivery.

The contractor **shall** ensure that maximum operational data volumes and complexity are part of the test configuration when verifying mission-specific functional and performance requirements.

The contractor **shall** notify designated Government representatives of verification events no fewer than ten (10) business days prior to the event, in order to allow the representatives to be present.

The contractor **shall** conduct a Test Readiness Review (TRR) prior to any major test verification activity or interface test, to demonstrate that all participants, subsystems, test equipment, test data, and other resources are ready and able to conduct and assess a verification event.

The contractor **shall** prepare and present a TRR data package for each TRR [CDRL RE 1].

The contractor **shall** ensure that the resources necessary to conduct integration and testing (includes GFP and interfaces to legacy systems) are available.

The contractor **shall** provide any additional hardware and software necessary to accomplish ESPDS Delivery installation, integration and testing.

The contractor **shall** ensure that equipment used for tests are in current calibration and so noted by tags or stickers.

The contractor **shall** provide any test data required to exercise the delivered capability during ESPDS Delivery and WA verification efforts when such data are not provided by the Government.

The contractor **shall** perform and document all analyses of data [CDRL IT 4] that result from ESPDS Delivery verification activities and interface testing, to determine if the ESPDS Delivery meets its ESPDS or WA requirements specifications [CDRL SE 5] and objectives.

The contractor **shall** define, document, execute, and evaluate regression tests for all modifications to installed Deliverables.

The contractor **shall** propose and implement Government approved corrective actions whenever ESPDS or WA requirements are not satisfied.

The contractor **shall** perform integration, test, and verification activities for externals based on Government prioritization as defined in the System Requirements Documents.

During on-site integration and testing, the contractor **shall** conduct daily on-site coordination meetings and teleconferences with Government representatives as requested by the government.

The contractor **shall** record verification data, conduct post-test analysis, and submit Post-Test Report Packages [CDRL IT 4], which includes the completed as-run procedures, test results, requirements verification status, and anomalies.

3.2.1   Interface Testing

The contractor **shall** work with STAR, OSGS, the NPOES/JPSS, GOES-R Ground Segment vendors, CLASS, OSPO, the ESPDS O&M contractor, and any other needed externals prior to and following an ESPDS Delivery, through the Government Project Management Office, to identify, plan, perform, and evaluate interface compatibility testing and results.

3.2.2   Factory Integration and Test

The contractor **shall** integrate and test ESPDS functions and interfaces at the factory prior to delivery, installation, and official verification at the operational site, including regression testing with the previously-shipped capability. Government representatives will monitor this testing.

The contractor **shall** submit TRR Packages [CDRL RE 1].

The contractor **shall** conduct pre-shipment factory tests using a Government approved test environment that is, with respect to function, configuration, and complexity, representative of the operational environment, to support determination of readiness for site installation.

The contractor **shall** prepare and conduct Pre-Ship Reviews (PSR) to demonstrate that ESPDS builds have completed the required level of factory functional and performance verification to ensure ESPDS and WA requirements are being met, and have sufficient technical maturity to authorize shipment to the operational site for the next level of integration and test.

The contractor **shall** submit a PSR Package [CDRL RE 2] for each ESPDS Delivery PSR. For development and sustainment efforts located within NSOF, the PSR and Readiness Reviews can be held jointly.

As applicable, the contractor **shall** deliver and transfer ownership of the environments used to develop, integrate and test the product on a case by case basis.

3.2.3   Site Integration and Testing

The contractor **shall** integrate and test ESPDS functions and interfaces at the operational site, including regression testing with the previously-shipped capability, in place of factory integration and test when directed by the Government. This includes factory remote access to the appropriate security zone at the operational site. Government representatives will monitor this testing.

The contractor **shall** submit a TRR Package [CDRL RE 1].

The contractor **shall** perform all site testing in a manner that does not interfere with operational systems and infrastructure collocated at the site.

The contractor **shall** plan and conduct all testing necessary to verify and validate that each ESPDS Delivery, as installed at the operational site and connected to operational interfaces, meets the ESPDS and associated WA functional, performance, and interface requirements.

The contractor **shall** provide on-site technical assistance for testing ESPDS Deliverables with the NPOES/JPSSS ground system, NDE, OSGS, CLASS and GOES-R ground segments and the ESPC.

3.2.4   Operations Readiness Testing

The contractor **shall** conduct ESPDS Delivery Readiness testing on the to-be-delivered WA capabilities as installed at the operational facility.

The contractor **shall** conduct regression testing to verify that any installation, maintenance, or upgrade does not impact previously-verified functions and performance.

The contractor **shall** prepare and conduct ESPDS Delivery Readiness Reviews to demonstrate the readiness of the ESPDS Delivery/WA capabilities for delivery to the Government for use in system testing and mission operations.

The contractor **shall** identify, develop, and manage the configuration of test data sets used to verify performance requirements, including test data that represent worst-case system loading scenarios.

3.3   Validation and Verification

The contractor **shall** develop a Verification and Validation Plan [CDRL SE 8] describing the planned ESPDS validation and verification capabilities that will be used to support design, development, integration and test, operations, sustainment.

The contractor **shall** deliver and implement a Verification and Validation Plan [CDRL SE 8] documenting the overall approach, activities, and plans to jointly (with the Government and ESPDS O&M contractor) verify and validate all ESPDS and WA functional, performance, and interface requirements.

The contractor **shall** verify that each ESPDS Delivery meets all requirements of the relevant WA, the ESPDS Requirement Specifications, and the Interface Requirements Documents.

The contractor **shall** deliver a Performance Verification Matrix [CDRL SE 10] upon completion of any verification activity.

The contractor **shall** ensure that the I&T Plan [CDRL IT 1]and the Verification and Validation Plan [CDRL SE 8] are consistent and describe the complete set of activities necessary to ensure ESPDS Delivery, including security assessment activities.

The contractor **shall** incorporate Government-provided test data in their verification activities, as directed and available.

The contractor **shall** change a requirement's verification status if site testing determines that a requirement verified previously is impacted by a subsequent delivery to reflect the current status.

The contractor **shall** retain verification items and results necessary to analyze or justify requirements verification status, until the end of the period of performance or as directed by the Government.

3.4   Modeling and Simulation

The contractor **shall** perform Modeling and Simulation in accordance with a Modeling and Simulation Plan [CDRL SE 11] describing the planned ESPDS model capabilities and their use for prototyping, emulation, and simulations that will be used to support design, concept validation, integration and test, verification, and operations.

The contractor **shall** submit Modeling and Simulation Analysis Reports [CDRL SE 12] documenting the results of the modeling and simulation analysis activities.

The contractor **shall** work with NESDIS STAR, NPOES/JPSS and GOES-R Ground Segment vendors, and ESPDS O&M contractor, as directed by the Government, to identify potential interface simulation tools necessary to support OSGS, NDE, CLASS, JPSS and GOES-R Ground Segment development and testing activities.

3.5   IT Security

The contractor **shall** comply with the Federal laws and regulations including, but not limited to, OMB Circular A-130, Management of Federal Information Resources, other OMB Circulars, Memoranda and Bulletins; the Federal Information Security Management Act (FISMA) of 2002 (Title III of the E-Government Act of 2002); National Institute of Standards and Technology (NIST) Special Publication 800-53, Recommended Security Controls for Federal Information Systems and Organizations; other NIST 800 Series Publications; NIST Federal Information

Processing Standards (FIPS) 200, Minimum Security Requirements for Federal Information and Information Systems; and other FIPS. The majority of information systems covered under this contract have a FIPS-199 rating of HIGH.

The contractor **shall** comply with the Department of Commerce Information Technology Security Program Policy (ITSPP), NOAA Administrative Order 212-13, NOAA Information Technology Security Policy and the NOAA IT Security Manual.

The contractor **shall** apply Information Technology (IT) security requirements for all phases the system life cycle in accordance with NIST SP 800-64, Security Considerations in the System Development Life Cycle, DOC System Development Lifecycle, the laws, statutes, and regulations on the NOAA IT security web page, in the NOAA IT Security Manual, and all relevant ESPDS policies and practices.

The contractor **shall** comply with DOC Enterprise Architecture requirements.

The contractor shall comply with the IT Security requirements of the Department of Commerce as outlined in Commerce Acquisition Regulation (CAR) 1352.239-73, Security Requirements For Information Technology Resources (October 2006), including development of a Security Accreditation Package as required by clause 73, section (i). In addition, personnel shall be screened in accordance with the requirements for **High Risk** contracts as specified by CAM 1337.70; specifically, in accordance with CAR 1352.237-71, Security Processing Requirements for Contractor/Subcontractor Personnel Working on a Department of Commerce Site or IT System (High or Moderate Risk Contracts) (December 2006).

The contractor **shall** comply with all rules, regulations, policies, procedures, schedules, etc., associated with the management and operations of the ESPC.

The contractor **shall** support updates to the applicable System Security Plan [CDRL IS 1] as a result of development and sustainment activities.

The contractor **shall** identify all ESPDS security controls per the current edition of NIST SP 800-53, in accordance with FIPS Publication 200, supplemented with justifications for tailoring or use of compensating controls.

The contractor **shall** treat the ESPC as a "high-impact" resource for security standard purposes as outlined in FIPS PUB 199 and FIPS PUB 200.

The contractor **shall** ensure that all developments operate as intended on systems using National Checklist Program Common Configurations such as the Federal Desktop Core Configuration.

The contractor **shall** ensure that common security configurations are implemented using the following order of precedence:

1. NESDIS
2. NOAA
3. DOC
4. Defense Information System Agency (DISA)
5. Center for Internet Security (CIS)
6. NIST

The contractor **shall** ensure that all designs enforce the principle of "least privilege" so that authenticated users are limited to accessing only those system objects required for the normal performance of their duties.

The contractor **shall** ensure that developments include anti-malware and Host-based Intrusion Prevention System (HIPS) functions within the development, integration and test, and operations environments. The contractor **shall** ensure that security testing includes the contractor-developed and procured end items.

The contractor **shall** conduct and document an E-Authentication Threshold Analysis and an E-Authentication Risk Assessment [CDRL IS 2].

The contractor **shall** provide a Privacy Threshold Analysis and Privacy Impact Assessments as needed [CDRL IS 3].

The contractor **shall** conduct the ESPDS E-Authentication Risk Assessment [CDRL IS 2]using the DOC E-Authentication Risk Assessment Template and the ESPDS E-Authentication Threshold Analysis using the DOC E-Authentication Threshold Analysis Template.

The contractor **shall** support the development and implementation of the Government's Data Denial Plan.

The contractor **shall** coordinate all security related incidents with the NOAA Computer Incident Response Team (N-CIRT)) and the ESPC Information System Security Officer (ISSO).

The contractor **shall** incorporate evaluations of supply chain risks across the system life cycle for all ESPDS Delivery items.

The contractor **shall** support the annual Security Control Assessments (SCA).

The contractor **shall** conduct vulnerability scanning of the system and deliver results, analysis and impacts [CDRL IS 5].

The contractor **shall** deliver an Environment Description Document [IS 6] which will be used for deliveries that are considered minor changes to an existing system, as determined by government IT Security.

The contractor **shall** assist ESPC ISSO and OSGS Security consolidate the ESPDS DSSP [IS 1] into the ESPC SSP.

The contractor **shall** provide inputs/updates as needed to the ESPC SSP once the ESPDS DSSP [IS 1] is part of the ESPC SSP.

4. DEVELOPMENT AND IMPLEMENTATION

The contractor **shall** design, develop, and deliver ESPDS Deliverables in accordance with WA Requirement Specifications, ESPDS Requirement Specifications, Interface Requirements Specifications [CDRL SE 6], and Interface Control Documents [CDRL SE 7].

The contractor **shall** perform ESPDS development activities in contractor facilities unless otherwise directed or approved by the Government.

The contractor **shall** ensure that all technology used in the design and implementation of ESPDS Deliverables meets a Technology Readiness Level of six (6) (as defined in the Technology Readiness Assessment Deskbook, July 2009, developed by the DoD) at the time of the Preliminary Design Review.

The contractor **shall** prepare and deliver the Design Descriptions [CDRL SE 13] and Database Design Descriptions [CDRL SE 14].

The contractor **shall** submit layouts and engineering drawings, and changes to them [CDRL SE 15], to serve as the basis for technical discussions, evaluations, operations, and maintenance.

The contractor **shall** purchase equipment, per Government purchasing policy, at the direction of and with approval by the Government.

4.1 Reviews

The contractor **shall** implement a program of periodic tabletop software peer reviews and engineering peer reviews throughout each ESPDS Delivery development life cycle, using technical expert review team members of whom a majority are external to the specific WA effort, to identify and address risks, problems, and issues as they arise prior to system-level reviews. Reviews will address the major ESPDS segments: Ingest, Product Generation, Product Distribution, and Infrastructure.

Requirements and Design Reviews

The contractor **shall** prepare and conduct requirements and design reviews for each ESPDS Delivery. The Government will designate a chairperson in contractor requirements and design reviews.

The contractor **shall** provide the Government with at least twenty (20) working days advance notification so that Government representatives can be present at all requirements and design reviews referenced in the SOW.

The contractor **shall** provide the Government with at least ten (10) working days advance notification on all requirements and design reviews schedule changes.

The contractor **shall** accommodate attendance by Government representatives at requirements and design reviews.

The contractor **shall** conduct a dry run of each requirements and design review, with the Government representatives in attendance (at the Government's discretion), approximately ten (10) working days prior to the actual review.

The contractor **shall** plan dry runs to be the same duration as the actual review.

The contractor **shall**, after each review, provide responses to Requests for Action (RFAs) generated within 30 calendar days following the reviews.

The contractor **shall,** after each review, document all RFAs in the ESPDS action item database within one (1) week.

The contractor **shall** consider each requirement and design review complete when approved by the Government.

The contractor **shall** conduct development cycle reviews in accordance with the Government PMO SEMP for post ORR development activities.

Peer Reviews (PRs)

The contractor **shall** invite Government representatives to participate in all contractor and sub-contractor peer reviews.

Delta Reviews

The contractor **shall** conduct Delta reviews at a time approved by the Government, if the Government determines that such reviews are required.

System Requirements Reviews / System Definition Reviews (SRRs / SDRs)

The contractor **shall** prepare and conduct a combined SRR/SDR for each ESPDS Delivery to review all ESPDS and WA-related requirements.

The contractor **shall** submit a SRR/SDR Data Package [CDRL RE 4] for each SRR/SDR.

Preliminary Design Reviews (PDRs)

The contractor **shall** prepare and conduct a PDR at the conclusion of each ESPDS Delivery preliminary design activity.

The contractor **shall** submit a PDR Data Package [CDRL RE 5] for each PDR.

Critical Design Reviews (CDRs)

The contractor **shall** prepare and conduct a CDR at the conclusion of each ESPDS Delivery detailed design activity.

The contractor **shall** submit CDR Data Package [CDRL RE 6] for each CDR.

Site Release Delivery Reviews

The contractor **shall** conduct Site Release Delivery Reviews (in accordance with the Government PMO SEMP) at a time approved by the Government, if the Government determines that such reviews are required.

4.2 Hardware Design and Implementation

The contractor **shall** use COTS hardware unless the contractor can demonstrate that the lifecycle cost, risk, and technical factors supporting a non-COTS solution are in the best interest of the Government.

The contractor **shall** provide a design report when any modifications are proposed to COTS products/segments [CDRL HW 1].

The contractor **shall** verify that units and modules are manufactured, processed, screened, and qualified, at a minimum, in accordance with UL-60950-1 Information Technology Equipment, Safety Part 1-General Requirements.

The contractor **shall** provide and deliver all items necessary to ensure proper operation of all ESPDS hardware provided.

The contractor **shall** document and implement an Electrostatic Discharge Control Program in accordance with ANSI/ESD S20.20.

The contractor **shall** document the hardware installation approach, activities, milestones, and resource requirements [CDRL HW 2].

4.3   Software Design and Implementation

The contractor **shall** develop, integrate, deliver, install, and test software in accordance with the Software Management and Development Plan [CDRL SW 1].

The contractor **shall** identify all Computer Software Configuration Items (CSCIs) in the Configuration Item Identification List [CDRL CC 5] in a manner consistent and compatible with the Government property management system.

The contractor **shall** ensure that all delivered software maintenance and user documentation complies with the NOAA/NESDIS Software Development, Maintenance, User Documentation S.24-806, Sections 2.0 and 3.0; and the SPSRB documentation standards.

The contractor **shall** use COTS software unless the contractor can demonstrate that the lifecycle cost, risk, and technical factors supporting a non-COTS solution are in the best interest of the Government.

The contractor **shall** provide a design report when any modifications are proposed to COTS software. [CDRL SW 2]

The contractor **shall** conduct a software qualification review for each version of software prior to actual release, including review of the results of testing and software verification.

The contractor **shall** develop a Software Release Delivery Package [CDRL SW 3] for each release of ESPDS Delivery software.

The contractor **shall** deliver all developed source and executable code to the Government as part of the Software Release Delivery Package [CDRL SW 3].

The contractor **shall** transfer to the Government all rights to developed software through an assignment, or widely recognized open source license at no additional cost to the Government.

The contractor **shall** develop Software Version Description(s) [CDRL SW 4] to support the release, tracking, and control of software versions.

The contractor **shall** develop Software Design Document(s) [CDRL SW 5] to describe ESPDS software design, architecture, structure, and processing.

The contractor **shall** provide all build instructions, special operating instructions, anomaly reports, change requests, release documentation, requirements matrices, history matrices, release history summary matrices and an inventory of delivered media necessary to ensure proper operation of contractor developed ESPDS software [CDRL SW 3].

The contractor **shall** transition new product software provided by STAR and other research partners to operations following all requirements for contractor-developed software.

The contractor **shall** perform a product requirements review with Government personnel at the start of each new product implementation activity.

The contractor **shall** perform reviews [CDRL SE 16]of software code received from STAR and other research partners to ensure optimal design compatibility with the operational environment, and to support development of implementation plans, cost estimates, and schedule and to assess impact to ESPC system availability and system security.

The contractor **shall** notify Government personnel in the bi-weekly status reports when code delivered by STAR or other collaborators deviates significantly from ESPC standards.

The contractor **shall** deliver, or update, the software development environment including all tools, libraries, software, test data, models/simulators, and documentation used in the implementation of the product, and required for later maintenance of the product.

5. QUALITY ASSURANCE

5.1 Product Assurance

The contractor **shall** prepare, submit, and implement a Quality Assurance Implementation Plan (QAIP) [CDRL QA 1].

The contractor **shall** maintain and update the QAIP throughout the POP.

The contractor **shall** have a Quality Management System that is compliant with the minimum requirements of ANSI/ISO/ASQC Q9001 Rev 2008.

The contractor **shall** support evaluation, review, audit, and inspection of the contractor, sub-contractors, and suppliers by designated representatives from NOAA, the Government Inspection Agency, or an Independent Assurance Contractor.

The contractor **shall** grant access for Government representatives to conduct Quality Assurance assessments and surveys upon notice.

The contractor **shall** provide resources to assist with the assessments/surveys with minimal disruption to work activities.

The contractor **shall**, upon request, provide Government representatives with documents and records required to perform their assurance activities.

Contractor personnel responsible for ESPDS assurance activities **shall** have direct access to contractor management, independent of contractor project management, with the functional freedom and authority to interact with other elements of their project.

The contractor **shall** report quality anomalies to the Government per the Project Management Plan [CDRL PM 1].

The contractor **shall** implement software quality assurance standards and processes, including analysis and measurement of observed software anomalies, to identify and address possible software reliability issues, and describe the processes and standards in the ESPDS Software Management and Development Plan [CDRL SW 1].

5.2 Reliability, Maintainability, and Availability

The contractor **shall** submit a Reliability, Maintainability, and Availability (RMA) Predictions Reports [CDRL QA 2] and update the RMA predictions to cover changes in ESPDS delivered configurations, hardware, and software.

The contractor **shall** implement a standard of metrics approved by the Government to support the following in the ESPDS RMA analyses; inherent availability, achieved availability, and operational availability.

The contractor **shall** perform numerical RMA predictions to validate that each ESPDS WA design meets RMA requirements.

The contractor **shall** use the following sources of failure rates for the reliability predictions:

 a) Performance of the same class of items
 b) Test data

c) MIL-HDBK-217F – Reliability Prediction of Electronic Equipment with updated failure rates (e.g., "Handbook of 217 Plus", "MIL-HDBK-472") from the Reliability Information Analysis Center, or equivalent.

The contractor **shall** make all predictions at a stated level of confidence.

The contractor **shall** analyze and report the following availability metrics in the ESPDS RMA analyses: inherent availability, achieved availability, and operational availability.

The contractor **shall** verify that all relevant preventive and corrective maintenance activities, such as system- and data-level backups, can be executed successfully without disrupting current work activities.

The contractor **shall** assure that fault tolerance and redundancy have been correctly specified, implemented, and verified.

5.3 Anomaly Reporting and Resolution

The contractor **shall** deliver with each ESPDS Delivery the diagnostic and fault isolation tools and procedures that are used for anomaly detection, isolation, and evaluation.

The contractor **shall** maintain all diagnostic and fault isolation tools and procedures that are used for anomaly detection, isolation, and evaluation.

The contractor **shall** capture, identify, store and deliver information and artifacts associated with any observed anomaly, to support identification, evaluation, resolution, and documentation.

The contractor **shall** ensure, when practicable, that anomaly information and artifacts can be retrieved and used for anomaly recreation, analysis, reporting, and resolution verification.

The contractor **shall** report any anomalies found during development, integration, installation, and verification for each ESPDS Delivery.

The contractor **shall** resolve any anomalies found during development, integration, installation, and verification for each ESPDS Delivery.

The contractor **shall** either use a Government specified system to capture, track, report status, and document resolution of WA anomalies, non-conformances, and test failures, or migrate this data from their internal system to the Government specified system upon WA delivery.

The contractor process for anomaly reporting **shall** support submission of ESPDS Delivery anomalies during the post delivery support period, Severity 1-5, within one working day of anomaly detection, where Severity levels are defined as:

1. Critical – Potential Loss of Product; High Priority

2. Urgent – Potential Loss of Product but workaround is in place; High Priority

3. Routine – Fix when schedule permits; Moderate Priority

4. Minor – Minor Problem

5. Enhancement – Minor Enhancement; Moderate Priority.

For each reported ESPDS nonconformance, the contractor **shall** conduct an investigation and engineering analysis sufficient to determine cause and corrective actions and receive Government authorization to disposition the nonconforming product.

For anomaly closure, the contractor **shall** include documented objective evidence of the verification of effective corrective action.

The contractor **shall** resolve all anomalies identified and assigned to the contractor before conclusion of contract.

6.   TRANSITION TO OPERATIONS

6.1   Site Preparation & Installation

The contractor **shall** perform ESPDS Delivery hardware and software installation and checkout at the operational site(s), including ensuring site readiness prior to delivery, delivery to the site(s), support for facility connections, and complete preparation for site integration and testing.

The contractor **shall** coordinate with the Government all ESPDS Deliverables and infrastructure plans and schedules.

The contractor **shall** coordinate and receive Government approval for activities at any Government site 30 days in advance of need dates.

The contractor **shall** provide all installation checklists, procedures, and tools.

The contractor **shall** perform all installation and checkout in a manner that does not interfere with operational systems and infrastructure collocated at the site.

The contractor **shall** work with the Government (OSPO, OSGS and STAR) to deliver a Transition to Operations Plan.

The contractor **shall** work with the Government and the ESPDS O&M contractor to integrate, test, and transition to operations all ESPDS Deliverables.

The contractor **shall** submit a Maintenance Plan [CDRL TO 8] that provides the plan for maintenance of the contractor-procured and developed hardware and software.

The contractor **shall** submit Maintenance Records [CDRL TO 9] for contractor-maintained portions of the Work Assignments.

6.2   Transition Support

The contractor **shall** develop and deliver Operations Handbooks [CDRL TO 1] for each of the ESPC Major Architectural Segments.

The contractor **shall** develop and deliver Operations and Maintenance Manuals [CDRL TO 1] for each of the ESPC Major Architectural Segments.The contractor **shall** develop and deliver Software User Manuals [CDRL SW 7] for each of the ESPC Major Architectural Segments.

The contractor **shall** develop and deliver Computer Operations Manuals [CDRL TO 3] for each of the ESPC Major Architectural Segments.

The contractor **shall** provide information and graphics highlighting the capabilities and interfaces of ESPC Major Architectural Segments, for Government use in Help Desk activities [CDRL TO 1].

The contractor **shall** provide user guides as part of user training [CDRL TO 5].

The contractor **shall** update handbooks, manuals, and user guides when impacted by an ESPDS Delivery.

The contractor **shall** provide baseline control for all delivered functionality through the period of performance of each pertinent WA.

6.3 Training

The contractor **shall** develop and deliver a Training Plan [CDRL TO 6].

The contractor **shall** provide on-site training for Government-designated personnel who will perform ESPDS Delivery validation, operations, and help desk services, to be documented in the Training Plan [CDRL TO 6].

The contractor **shall** develop and provide training classes based on the NESDIS Standard No. S24.804, General Requirements for Training on Electronics Equipment, which establishes requirements for the content and conduct of contractor training courses..

The contractor **shall** provide on-site training for Government-designated personnel who will take on responsibility for ESPDS Delivery hardware and software/firmware maintenance.

The contractor **shall** provide training and Training Documentation [CDRL TO 7] that covers all aspects of the ESPDS Deliverables, including normal and contingency operations, hardware configuration and maintenance, software/firmware configuration and maintenance, interfaces, infrastructure, configuration management, and procedures.

The contractor **shall** support updates to the ESPDS training and materials to reflect any changes to the ESPDS, its interfaces, or its processes as defined and approved by the Government.

6.4 Operational Acceptance

The contractor **shall** support regression testing to verify that any installation, maintenance, or upgrade does not impact previously-verified functions and performance.

The contractor **shall** provide an Operational Readiness Review Package [CDRL RE 7].

The contractor **shall** provide a Systems Acceptance Review Package [CDRL RE 8].

7. SUSTAINMENT SUPPORT

The contractor **shall** work with OSPO to coordinate sustainment, maintenance, and development of the operational system.

The contractor **shall** be available for consult with OSPO in the event a system anomaly occurs that requires developer subject matter expertise on determining root cause and for providing options for resolution.

The contractor **shall** ensure that any upgrades or addition of software developed to support ESPDS specific requirements under this SOW does not compromise the security posture of the operational system.

The contractor **shall** provide a Sustainment, Maintenance, and Lifecycle Cost Predictions Report (SMLC) (CDRL TO 11)

Appendix I - Acronyms

ARB	Anomaly Review Board
C&A	Certification and Accreditation
CAR	Commerce Acquisition Regulation
CCB	Configuration Control Board
CR	Change Request
CDR	Critical Design Review
CDRL	Contract Data Requirements List
CMMI	Capability Maturity Model Integration
CIP	Critical Infrastructure Protection
COTR	Contracting Officer's Technical Representative
COTS	Commercial Off-The-Shelf
DOC	Department of Commerce
DoD	Department of Defense
DOORS	Dynamic Object-Oriented Requirements System ®
EAR	Export Administration Regulations
ESPC	Environmental Satellite Processing Center
ESPDS	Environmental Satellite Processing and Distribution System
EVMS	Earned Value Management System
GAS	GOES-R Access Subsystem
GCOM	Global Change Observation Mission
GOES	Geostationary Operational Environmental Satellite
GOES-R	GOES R-Series
GSD	Ground Systems Division
GWAC	Government Wide Acquisition Contracts
IBR	Integrated Baseline Review
IMP	Integrated Master Plan
IMS	Integrated Master Schedule

IPT	Integrated Product team
IT	Information Technology
ITAR	International Traffic in Arms Regulations
JPSS	Joint Polar Satellite System
NASA	National Aeronautics and Space Administration
N-CIRT	NOAA Computer Incident Response Team
NESDIS	National Environmental Satellite, Data, and Information Service
NIST	National Institute of Standards and Technology
NOAA	National Oceanic and Atmospheric Administration
NPOESS	National Polar-orbiting Operational Environmental Satellite System
NPP	NPOESS/JPSSS Preparatory Project
NSOF	NOAA Satellite Operations Facility
O&M	Operations and Maintenance
OSGS	Office of Satellite Ground Services
OSPO	Office of Satellite Product Operations
PDR	Preliminary Design Review
PMSR	Project Management Status Review
POES	Polar-orbiting Operational Environmental Satellites
PSR	Pre-Ship Review
RFA	Request For Action
RMA	Reliability, Maintainability, and Availability
SCAMPI	Standard CMMI Appraisal Method for Process Improvement
SDR	System Definition Review
SEI	Software Engineering Institute
SOW	Statement of Work
SRR	System Requirements Review
STAR	Center for Satellite Applications and Research
TBD	To Be Determined
TIM	Technical Interchange Meeting

| TRR | Test Readiness Review |